

Spirochetal Diseases

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Learning Objectives

- **Describe the etiology, signs and symptoms, and treatment of primary syphilis.**
- **Describe the signs and symptoms of secondary syphilis.**
- **Describe the signs and symptoms and treatment of neurosyphilis.**

Learning Objectives

- **Describe the etiology, differential diagnosis, signs/symptoms, laboratory findings and treatment of Relapsing Fever.**
- **Describe the etiology, signs/symptoms, laboratory findings, treatment, and prognosis of Lyme Disease.**
- **Describe the etiology, signs/symptoms, complications, and treatment of Leptospirosis.**

Spirochetes

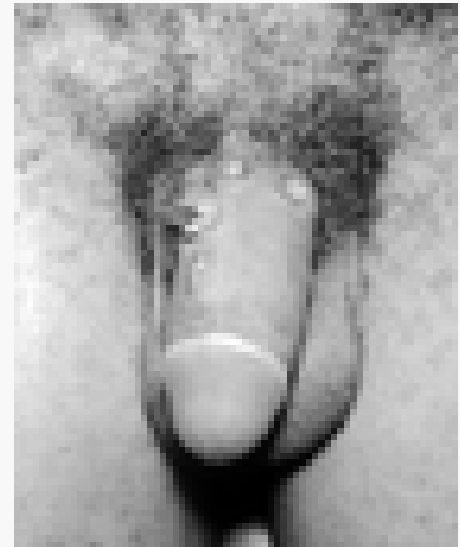
- **Definition- Saprophytic (lives on dying matter) bacteria characterized by spiral, flexible filaments**

Syphilis

- **Etiology- Treponema palladium- Can affect any organ in the body.**
- **The “Great Imitator”**
- **Differential Diagnosis includes:**
 - **Flu - Glomerulonephritis**
 - **Arthritis - Coronary Artery Disease**
 - **Malaise - Condyloma**
 - **Iritis - Neuropathies**

Primary Syphilis: Signs and Symptoms

- Painless ulcerative lesion on genitals, lips, tongue, pharynx
- Regional lymphadenopathy



Ulceration on penis

Primary Syphilis: Laboratory Studies

- **Serologic Testing: + RPR, VDRL, FTA-ABS (Fluorescent Treponemal Antibody Absorption)**
- **Microscopic Examination-Bacteria in biopsies and cultures of lesions**
 - **Darkfield Micro Exam - Immunofluorescent Staining**

Primary Syphilis: Treatment

- **Penicillin G [generic]: 2.4 million units IM**

or
- **Tetracycline [generic]: 500 mg po QID x 14d**

or
- **Ceftriaxone [generic]: 1 gram QD IM or IV x 10d**
- **Syphilis must be reported to the local public health agency**

Syphilis: Warning

- **Jarisch-Herxheimer Reaction**
 - **Sudden destruction of spirochetes can result in a large release of toxic products**
 - **Occurs in first 24 hours**
 - **Corticosteroids and antipyretics can help control reaction**

Secondary Syphilis

- **Signs and Symptoms**
 - **Macular papular rash**
 - **Mucous membrane lesions**
 - **Weeping papules**
 - **Nontender lymphadenopathy**
 - **Fever**
 - **Meningitis/Hepatitis/Iritis/Arthritis**



Secondary syphilis
manifested on labia

Neurosypphilis

- **Rare complication if syphilis is treated early**
- **CSF should be evaluated if neurological symptoms or ophthalmologic symptoms appear**

Neurosyphilis: Signs and Symptoms

- **Meningitis**
- **Tabes Dorsalis**
- **Muscular hypotonia**
- **Impaired proprioception**
- **Gastric and laryngeal crises**
- **Paresis**
- **Change of personality**

Neurosypphilis: Treatment

- **Aggressive treatment**
- **Supportive treatment**
- **If evidence of tertiary syphilis, (aortitis, gumma, etc) hospitalization with IV antibiotics and frequent use of short acting penicillin**
- **Frequent follow-up and laboratory evaluation**

Relapsing Fever

- **Etiology: *Borrelia recurrentis***
- **Found primarily in the western United States**
- **Reservoir: infected by ticks**
- **Cannot be transferred from patient to patient**
- **Can be passed by louse infestation in family**



Tick-borne Relapsing Fever
Residual tick bites

Relapsing Fever: Differential Diagnosis

- **Malaria**
- **Meningococccemia**
- **Yellow fever**
- **Typhus**
- **Leptospirosis**

Relapsing Fever: Signs and Symptoms

- **Abrupt onset of fever, chills**
- **Headache**
- **Tachycardia**
- **Nausea and Vomiting**
- **Organomegaly**
- **Various exanthems**

Relapsing Fever: Signs and Symptoms

- **Attacks last 3-10 days**
- **Recur every 1 to 2 weeks**
- **Relapses might occur up to 10 times before complete recovery**

Relapsing Fever: Laboratory Exams

- **Wright's Stain & Giemsa Stain reveal large spirochetes**
- **STS may show false positive**
- **CSF changes may occur**
- **Anemia and Thrombocytopenia**



Relapsing Fever: Treatment of Louse-borne

- **Tetracycline [generic]: 500 mg po x 1**

or



- **Procaine PCN G [generic]: 600,000 units IM x 1**

Relapsing Fever: Treatment of Tick-borne

- **500 mg Tetracycline [generic]
QID x 10 days and aspirin**

- **Prognosis**

Mortality remains at 5% with the elderly, debilitated, and very young

Lyme Disease/Lyme Borreliosis

- **Etiology: *Borrelia burgdorferi***
- **The most common vector-borne disease in the United States**
- **Deer Tick is primary carrier in the United States, the bite is generally painless**



Deer tick

Lyme Disease: Signs and Symptoms

- **Stage 1**
 - **Erythema Migrans 1 week after bite, resolves in 3-4 weeks**
 - **Lesion appears in groin, axilla or thigh**
 - **Flu like symptoms = fever, chills and myalgias**



Lyme Disease: Signs and Symptoms

- **Stage 2 Early disseminated infection**
 - **Spirochetes move to blood or lymph**
 - **Most often affects skin, CNS/MS systems**
 - **Secondary lesions may develop in 50%**
 - **Multiple myalgias, Fatigue, Malaise**
 - **Pain is migratory**
 - **Neuro signs are meningitis, Bell's Palsy, encephalitis, forgetfulness/irritability**

Lyme Disease: Signs and Symptoms

- **Stage 3 The late persistent infection**
 - **Months to years after infection**
 - **Joint and periarticular pain**
 - **Frank arthritis**
 - **Chronic synovitis,
antibodies in joint fluid**
 - **May fail to respond to antibiotics**

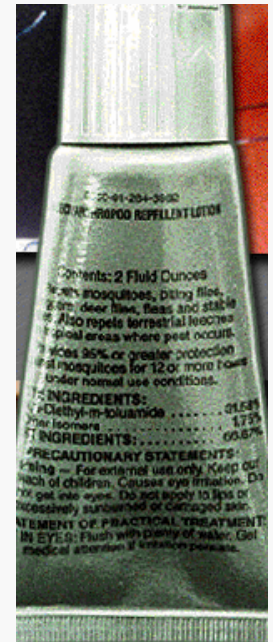


Lyme Disease: Lab Findings

- **B. burgdorferi in serum**
- **Western Blot assay with IgM (2-4 wks), IgG antibodies (4-6 months)**
- **Positive ELISA test**
- **Lyme Urinary Test- not reliable**
- **Blood Cultures for B. burgdorferi**
- **Inflammation in CSF**

Treatment: Lyme Disease

- Prevention is best treatment with proper clothing, DEET
- Prophylaxis post tick bite controversial, unproven to enhance protection
- Recombinant Vaccine developed but pulled from market
- Tetracycline: drug of choice
- Ampicillin/Ceftriaxone, Zithromax®



Lyme Disease: Treatment

- **Erythema Migrans:
Doxycycline 100 mg BID**
- **Bell's Palsy: Doxy or
Amoxicillin for three weeks**
- **Meningitis: Ceftriaxone 2
grams IV QD for 2 to 4 weeks**
- **Arthritis: ATB therapy and NSAIDs**

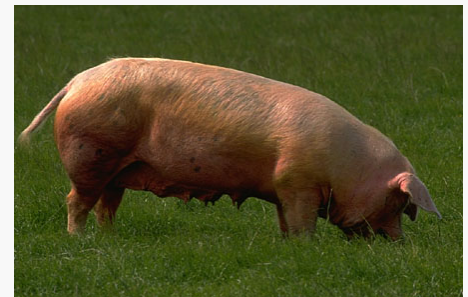


Lyme Disease: Prognosis

- **Symptoms will resolve in four weeks**
- **Most patients have full recovery**
- **Unknown outcomes for those with cardiac symptoms**

Leptospirosis

- **Etiology: *Leptospira interrogans***
- **Primary serotypes inhabit rats, dogs, cattle, swine**
- **Conveyed to humans through the ingestion of contaminated food and drink or through the eyes or skin lesions**



Leptospirosis: Signs and Symptoms

- **Initial Phase**
 - **Flu like symptoms: Fever, chills, abdominal pain, headache, myalgias (primarily calf muscles)**
- **Secondary Phase**
 - **Leptospire in CSF, Blood**
 - **Uveitis, Rash, Adenopathy, Pneumonia, Hypotension**
 - **Icteric Leptospirosis (Weil's Syndrome)**
 - **Impaired renal, hepatic function**

Leptospirosis: Laboratory Findings

- **Leukocytosis greater than 50,000**
- **Abnormal UA with bile, protein, casts, red cells**
- **Elevated bilirubin**
- **Darkfield examination**
- **Agglutination tests**
- **IgM enzyme immunosorbent assay**

Leptospirosis: Complications

- **Myocarditis**
- **Aseptic Meningitis**
- **Renal Failure**
- **Pulmonary Infiltrate**
- **Death**
- **Prognosis- Even with jaundice the mortality is less than 5%**

Leptospirosis: Treatment

- **Penicillin: 6 million units QD IV**
- **Doxycycline: 200 mg po once/week for prophylaxis**
- **Warning: Jarisch-Herxheimer reaction**
- **Observe for renal failure**

Summary

- **Etiology, signs and symptoms, and treatment of primary syphilis**
- **Signs and symptoms of secondary syphilis**
- **Signs and symptoms and treatment of neurosyphilis**

Summary

- **Etiology, differential diagnosis, signs and symptoms, laboratory findings and treatment of Relapsing Fever**
- **Etiology, signs and symptoms, laboratory findings, and treatment, and prognosis of Lyme Disease**
- **Etiology, signs and symptoms, complications, and treatment of Leptosporosis**